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crystallographic systems of Naumann, Weiss and Miller, with formulas for converting the symbols of one system into those of another. Tenth, atomic weights of the elements. Eleventh, an essay on the history of the names of geologic formations, by J. Walther. Twelfth, rules for the termination of proper names in scientific literature. Thirteenth, a brief notice of the advance of geology for the year. Fourteenth, list of geologists who have died since October 1, 1897. Fifteenth, table of the commonly-used measures of length. Sixteenth, isogonic chart of Europe for 1899. Seventeenth, lists of periodicals now published. Eighteenth, a list of geological, paleontological and mineralogical literature for 1898. (Very incomplete, particularly as regards America, and frequently useless because name of periodical is not given.) Following is a chart of map scales, a daily calendar, a few blank pages for accounts, and blank and cross-section pages for geologic notes. Then come 26 pages of advertisements of German materials for use in geologic investigation and teaching. Worthy of notice among these advertisements is Professor Dames' Geological Globe, of 34 cm. diameter, which will be useful in every geological laboratory.

The writer found the first edition of this book an invaluable *vade mecum* in a European trip. At home the book serves as a valuable check-list for the sending of separates, for information concerning geologic maps, and while it is not particularly adapted to the American geologist it is a welcome addition to the reference books one keeps about his desk. A handbook for the field geologist has yet to be written. Just what such a book should contain is probably difficult to ascertain.

J. B. WOODWORTH.

The Chinch Bug. By F. M. WEBSTER. Bull. No. 15, N. S., Div. of Entomology, U. S. Dept. of Agriculture. [November] 1898. Pp. 82.

This excellent bulletin deals with a subject of perennial interest to farmers and entomologists; and although the literature of the chinch bug is already large, Professor Webster has found plenty of new and interesting things to say about it. In the most interesting and convincing way, he shows how the insect may have origi-

nated in Central America, and spread northward in three columns, one along the Pacific coast, the second over the prairie region east of the Rocky Mountains, and the third along the shores of the Gulf of Mexico and Atlantic ocean. On p. 72 a map is given illustrating these migrations. The Pacific column appears to be weak, and is little known, but the other two are strong in numbers. In the course of these migrations the insects have become modified, and it is clearly shown that the Atlantic and prairie hordes differ both in habits and structure. Just at this point the present writer is inclined to disagree with Professor Webster's opinion, that there is only one species of *Blissus* in North America. There are reasons for believing that we have at least three species, and Montandon (Ann. Soc. Ent. Belg., XXXVII., 1893) has described as new *B. hirtus* from North America, and *B. pulchellus* from Central and South America. Unfortunately, I have not access to these descriptions, but from the data furnished by Professor Webster we may separate the following:

1. Form of Central America and the West Indies: Macropterous, perhaps of larger average size than the North American type. This may be Montandon's *pulchellus*.

2. Form of the prairie region of North America, probably also of California: Macropterous, more slender and less hairy than the coast insect. This is doubtless Le Baron's *Rhyparochromus devastator*, and will be called *Blissus devastator* (Le Baron). This insect occurs in small numbers, and is evidently native, along the eastern base of the Rocky Mountains, in Colorado and New Mexico. Like the Colorado potato beetle, it has become destructive when, moving eastwards, it found the cultivated fields of the central States. Professor Webster shows that it is very destructive to wheat and corn, but rarely attacks timothy. It has two annual broods.

3. Form of the coast region and northeastern States. This is doubtless the true *Blissus leucopterus*, Say. It has both brachypterous and macropterous forms, and is somewhat broader and decidedly more hairy than *devastator*. It predares almost exclusively upon timothy grass and is single-brooded.

4. Another brachypterous sea-coast form, quite hairy and with colorational peculiarities, has been found at Lake Worth, Florida, and Fortress Monroe, Virginia, as recorded by Dr. L. O. Howard. I do not know whether this is Montandon's *hirtus*.

It seems to the writer that the probability of there being at least three species among the above insects is great enough to deserve serious consideration. If those who have the material will boil up a number of each in caustic potash, and examine the structural characters under the microscope by transmitted light, it is probable that new differences will appear, especially in the male genitalia. If it can be established that the seriously destructive insect of recent years is *B. devastator*, and not *B. leucopterus* at all, and that the former is still migrating eastwards, the fact will not only be of scientific but of economic importance.*

T. D. A. COCKERELL.

MESILLA PARK, N. M.,

November 24, 1898.

Postscript, December 9th. Dr. L. O. Howard writes me: "The eastern form [*leucopterus*] injures many plants, including rice. That it is apparently more resistant to fungus attack, however, was shown in a curious way last summer, when it damaged grass lawns in the heart of the City of Brooklyn in an abnormally wet season and in spite of repeated drenchings from the sprinkler hose."

A Manual of Chemical Analysis, Qualitative and Quantitative. By G. S. NEWTH, Demonstrator in the Royal College of Science, London. New York, Longmans, Green & Co. 1898. Pp. vii + 462.

This book is a decided departure from the usual manuals of qualitative and quantitative analysis. The author has endeavored, and with much success, to present a book which will teach the theoretical as well as the practical side of analytical chemistry and to avoid as far as possible teaching mechanical opera-

tions. He has divided the volume into two parts: Book I., of 136 pages, treating of qualitative analysis; and Book II., giving the methods of gravimetric and volumetric analysis of inorganic substances, including the analysis of the more simple gases, of the determination of carbon, hydrogen, nitrogen, sulphur and the halogens in organic compounds, and of some simple physico-chemical experiments.

The subject of qualitative analysis is treated in a broad way, and the student who follows the text conscientiously will obtain a wide knowledge of general chemistry. The author first shows how the subject can be classified according to the reaction with the group reagents, and then considers the properties of the separate elements. The general chemistry of each of the more common elements is discussed, giving only those properties which are useful for the separation and identification of the elements in analysis, and after having considered the properties of a group of elements there is given a summary of the particular properties which are utilized in separating the members of the group. The general reactions taking place, the properties of the substances and their compounds are so clearly stated and the subject is so logically developed that the qualitative separation of the substances follows naturally, and the quantitative separation is but a step further. This is particularly true of that portion of the book which treats of the oxidation and reduction of iron, chromium and manganese compounds. The reactions of chromium and the separation in the presence of phosphates, which are often difficult points for the student to grasp, are fully and satisfactorily explained. The separation of iron, chromium and aluminium is based upon the oxidation of chromium to chromic acid by sodium peroxide and the solubility of aluminium hydroxide in sodium hydroxide, and should commend itself more favorably than the usual methods of separation for this group. Another point which deserves special mention is the fact that after each group follows an appendix in which the properties of the rarer elements of that group are considered. The concluding chapter of the portion of the book devoted to qualitative analysis is full of sound advice on the in-

* On p. 50 Professor Webster notes that few chinch bugs died from the parasitic fungus in the timothy meadows of northern Ohio. These were the *B. leucopterus*, which, coming from a relatively damp region, may have acquired greater powers of resistance to the fungus attack than *B. devastator*, from the dry prairies of the far West.